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# UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 C.F.R. § 1.53(b))

Attorney Docket No. \_\_\_\_\_  
First Inventor or Application Identifier RICHARD J. DITZIK  
Title Modular Notebook and PDA Computer Systems for Person  
Express Mail Label No. EJ 731323963US

## APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO: Assistant Commissioner for Patents  
Box Patent Application  
Washington, DC 20231

- ☒ \* Fee Transmittal Form (e.g., PTO/SB/17)  
(Submit an original and a duplicate for fee processing)
- ☒ Specification [Total Pages 24]  
(preferred arrangement set forth below)
  - Descriptive title of the invention
  - Cross References to Related Applications
  - Statement Regarding Fed sponsored R & D
  - Reference to Microfiche Appendix
  - Background of the Invention
  - Brief Summary of the Invention
  - Brief Description of the Drawings (if filed)
  - Detailed Description
  - Claim(s)
  - Abstract of the Disclosure
- ☒ Drawing(s) (35 U.S.C. 113) [Total Sheets 9]
- Oath or Declaration [Total Pages 33]
  - ☒ Newly executed (original or copy)
  - ☒ Copy from a prior application (37 C.F.R. § 1.63(d))  
(for continuation/divisional with Box 16 completed)
    - ☐ DELETION OF INVENTOR(S)  
Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. §§ 1.63(d)(2) and 1.33(b).

- ☐ Microfiche Computer Program (Appendix)
- Nucleotide and/or Amino Acid Sequence Submission  
(if applicable, all necessary)
  - ☐ Computer Readable Copy
  - ☐ Paper Copy (identical to computer copy)
  - ☐ Statement verifying identity of above copies

## ACCOMPANYING APPLICATION PARTS

- ☐ Assignment Papers (cover sheet & document(s))
- ☐ 37 C.F.R. § 3.73(b) Statement of Power of Attorney  
(when there is an assignee)
- ☐ English Translation Document (if applicable)
- ☐ Information Disclosure Statement (IDS)/PTO-1449 [Copies of IDS Citations]
- ☒ Preliminary Amendment
- ☐ Return Receipt Postcard (MPEP 503)  
(Should be specifically itemized)
- ☐ \* Small Entity Statement filed in prior application, Status still proper and desired  
(PTO/SB/09-12)
- ☐ Certified Copy of Priority Document(s)  
(if foreign priority is claimed)
- ☒ Other: Old Specification, old claims;  
Old Declaration, old informal  
Drawings, Prelim. Amendment

NOTE FOR ITEMS 1 & 13: IN ORDER TO BE ENTITLED TO PAY SMALL ENTITY FEES, A SMALL ENTITY STATEMENT IS REQUIRED (37 C.F.R. § 1.27), EXCEPT IF ONE FILED IN A PRIOR APPLICATION IS RELIED UPON (37 C.F.R. § 1.28).

16. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment:

☐ Continuation ☒ Divisional ☐ Continuation-in-part (CIP) of prior application No: 08 / 832,923  
Prior application information: Examiner Urban, E. Group / Art Unit: 2746

For CONTINUATION or DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 4b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

## 17. CORRESPONDENCE ADDRESS

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IN THE U.S. PATENT AND TM OFFICE

Serial No. \_\_\_\_\_

Filing Date: 09/08/99

Applicant: Richard J. Ditzik

Title: Modular Notebook and PDA Computer Systems for Personal Computing and  
Wireless Communications

Examiner: Urban, E Art Unit 2746

Date: August 08, 1999

Divisional Application Under CFR § 1.53(b)

Preliminary Amendment

Honorable Assistant Commissioner  
for Patents  
Washington, D.C. 20231

Sir:

This is a continuation divisional application whose entire disclosure is Ser. Nr.08/832,923, filed 04/04/97, which is hereby incorporated by reference. This statement is also placed as first sentence of reprinted specification filed herein.

Also filed herein is a *reprinted reformatted* application based on the parent application 08/832,923 -- with former and new amendments included. **No new matter added.**

IN THE CLAIMS:

New Claims 1- 6 are herein submitted in this instant application are as follows.

1. A portable computer-display unit with a cover assembly hinged at one edge and adapted to a clamshell notebook -like assembly, wherein said computer-display unit is made relatively thin and light weight so that users can easily carrying it for long periods of time, the portable computer-display unit comprising:

a. a flat panel display assembly having a flat panel display device, microcomputer system means, support electronics and assembly housing;

b. expandable hinge means attached at one edge of the flat panel display assembly housing;

c. a cover assembly roughly the same size of the flat panel display assembly, attached at one edge of the expandable hinge means, such that the user has options to open and close said cover assembly and flat panel display assembly like a book; and

d. said expandable hinge means adapted so that users have options to place relatively thin flat objects such as papers between the flat panel display assembly and said cover assembly, wherein said expandable hinge means will expand to accommodate to the thickness of said thin flat objects.

2. A method of controlling a computer-display handset unit operated by a user, said computer-display unit comprising the steps of:

a) executing a micro computer operating system for control of said portable computer-display unit, wherein said operating system is adapted to accepting user inputs and generating processing outputs of said portable hand held computer-display units;

b) selecting a plurality of computing and communication modes in coordination with said executing micro computer operating system step, wherein said modes includes wireless voice, wireless data and convention computing functions, and wherein said user has options to run these modes roughly simultaneously and said selecting step is manual or automatic;

c) controlling said plurality of computer and communications modes, such that multiple functions of said hand held computer-display unit appear roughly simultaneous and seamless in operation; and

d) executing a plurality of application programs under control of said operation system and controlling step, wherein said plurality of program functions such as internet browser functions, e-mail functions, voice communications, voice mail, personal productivity functions and telephony functions.

3. A notebook computer unit having two leaf structures that can be opened and closed like a book, wherein the computer unit can be used for conventional personal computing and data processing functions by a user, notebook computer unit comprising:

- a) a flat panel display assembly having a flat panel display device, control electronics and connection means all of which forms a first leaf structure;
- b) a microprocessor system electrically interfaced to said flat panel display assembly, having control circuitry, internal memory means and data storage means;
- c) a battery power means electrically connected to said flat panel display microprocessor system and flat panel display device; and
- d) a cover assembly forming a second leaf structure which is hinge connected to said flat panel assembly at an edge of each leaf structure, wherein said cover assembly has a recessed cutout area for optional placement of a wireless communications handset or other objects, and wherein the cut out area is slightly larger than said object and roughly equivalent shape and deep enough for said object to fit, such that said notebook computer unit can be closed.

4. A portable computer-display unit having a notebook-like arrangement having two leaf structures, in which a user has an option to open and close like at book, the portable computer-display unit comprising:

- a) a flat panel display assembly defining a first leaf structure, comprised of a display device, display screen, drive electronics, and control electronics;

- b) microcomputer system electrically interfaced to said flat panel display device, said microcomputer system having a microprocessor unit, data storage means, input/output means and control circuitry;
- c) a roughly transparent cover panel defining a second leaf structure, hinged to said first leaf structure at one edge of each leaf structure, wherein said user can open and close the two leaf structures like a notebook; and
- d) said transparent cover panel being sufficiently transparent so that said display screen information is viewable when said leaf structures are closed.

5. A notebook computer having a clam shell like structure having two leaf halves that a user can open and close like a book, the notebook computer comprising:

- a) a display assembly having a flat panel device, display screen and control electronics;
- b) a cover assembly pivotally attached at one edge of said display assembly via a hinge means, wherein the user have options to open and close said display assembly and cover assembly like a book;
- c) a relatively thin sheet-like member interposed between said display assembly and said cover assembly is pivotally attached to said hinges means, wherein said thin sheet member serves in-part as a physical protection function; and
- d) said thin sheet-like member is roughly the same length and width as said cover assembly or display assembly, wherein said sheet-like member can be pivotally moved back and forth like a page in a book.

6. A battery operated portable electronics unit adapted for quick and easy battery means replacement so that a user can refresh said battery means, the portable electronics unit comprising:

- a) a power unit having a battery source, first electrical connection means, and first housing enclosure;
- b) a control unit assembly having support electronics, second electrical connections means and second housing enclosure, wherein said electronics unit is adapted to physical attachment and electrical connection to said power unit;

- c) said power unit and said electronics unit are adapted to physical attachment and electrical connection at external surfaces of said first and second housing enclosures, wherein electrical mating is accomplished via electrical connector means, and wherein said physical attachment of said housing enclosures is accomplished via external surface connection and latching means;
- d) said external surface connection and latching means is adapted to quick release and attach functions, having finger or hand actuated mechanical release and latching function, for which separate tool or tools are not required.

#### **IN THE SPECIFICATION:**

With respected to the originally filed application of 08/832,923 filed on 04/04/97 the following corrections have been made in the application herein submitted:

Page 4, line 20, "Fig. 8" as originally filed, is herein replaced with -- Figs. 8A and 8B --

Page 7, line 7, the label number "34" as originally filed is herein changed to -- 35 --

Page 8, line 12, between the words "of" and "invention", add the word: -- the --

The above correction have been made to the reformatted reprinted specification filed herein.

#### **IN THE DRAWINGS:**

In the previously informal drawings filed 04/04/97, Element 34 was erroneously used twice, once in Fig. 2 and once in Fig. 3. Therefore, applicant requests drawing element 34 of Fig. 2 to be changed to 35, and the element 34 of Fig. 3 to remain the same.

Informal drawing Fig. 8 has been split into two figures: Fig. 8A and Fig. 8B, in order in satisfy office drawing rules.

In the Informal Drawings filed 04/04/97, in Fig. 1, element label 4A was erroneously missing. In the Formal drawings herein submitted, applicant has added label 4A to Fig 1.

Element 4A was clearly stated in originally filed specification on page 6, line 12. *No new matter added.*

### **REMARKS**

Each new claim so far is a independent claim. However, applicant intends to amend the application with dependant claims at a later time. Applicant respectfully submits Claims 1-6 are novel under 35 U.S.C 102 and nonobvious under the meaning of 35 U.S.C. 103(a). Therefore, applicant requests the Claims 1 -6 be placed into allowance.

Sincerely,



Richard J. Ditzik  
Applicant Pro Se

Date: 9-8-99

307 Surrey Drive  
Bonita, CA 91902  
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Patent Application of  
Richard J. Ditzik  
for

**Modular Notebook and PDA Computer Systems for  
Personal Computing and Wireless Communications**

**BACKGROUND OF THE INVENTION**

**1. Field of the Invention**

This invention relates to portable personal computer systems with external communication means, which can be used by an individual in both desktop and mobile environments. The computer system involves a relatively large color flat panel display, conventional microcomputer system, and a plurality of human interface means. In particular, it relates to a computer unit, having a light weight thin notebook-like computer structure that is capable of performing personal digital assistants (PDA) like functions and wireless external communications of voice, text, graphic and image data.

**2. Description of Prior Art**

There are several shortcomings with prior art notebook computers, PDAs and wireless telephone units. Notebook computers have a relatively large flat panel display device, a full alphanumeric keyboard and battery power. PDAs are small handheld units with a small LCD display, small key pad and touch pen. PDAs are designed to be placed in one's pocket or purse for maximum portability. A problem arises when customers desire large high resolution color display for both portable and desktop applications. To use a computer system for both portable and desktop uses, the customer must purchase multiple systems. The cost of color flat panels are still too expensive for most customers to buy two display monitors, one display for desktop and one for the portable applications. Many customers require functionality of a desktop computer, notebook computer and PDA, but it is much too expensive to purchase multiple CPUs, displays, and keyboards.



U.S. Patent 5,189,632 of Paajanen et al disclosed a hand held computer unit with an antenna and wireless RF communication capability, small flat panel display and a keyboard, in a partial clam shell type structure. However, they do not teach expandable hinge means, base station for handset relay functions, or cover latching function. U.S. Patent 5,327,486 of Wolff et al teach a conventional laptop computer with antenna and RF communications to a radio network and local exchange telephone network. However, they fail to teach expandable hinge means, edge hinge means, handset means or base station relay functions. U.S. Patent 5,459,458 of Richardson et al teach a virtual pager and data terminal system. However, they do not teach notebook like computers, base unit station or personal/PDA computing. U.S. Patent 5,008,927 of Weiss et al teach a computer and telephone system with a display screen on a conventional telephone structure keyboard unit. However they fail to teach notebook like structure, wireless communication or handset relay functions. U.S. Patent 5,196,993 of Herron et al teach a laptop computer with a removable flat panel display with built-in support feet for desktop support. However, they fail to teach expandable hinge means, exterior communications functions, cover latching functions or computer display assembly. U.S. Patent 5,200,913 of Hawkins et al teach a laptop computer with flat panel display and pen input means. However, they fail to teach expandable hinge means, edge mounted hinge or latching functions.

Wireless hand held computer devices, such as cellular and Personal Communication System (PCS) telephones, have limited display capabilities. Prior art wireless computer units have display screens that are small (1.5 - 2.5" diameter), and they lack interactive capabilities to be successful for text, graphic and video applications. Some prior art notebook and laptop computers have integrated wireless communication means, but they are too large and bulky to be successful for in mobile uses. Prior art wireless devices do a poor job of providing voice, data and video communication functions. Typical wireless computer systems have display screens that are too small and have limited computing power. Prior art laptop and notebook computers are too heavy to carry for long periods. Inventions herein solve these problems by embodying a unique relatively thin notebook-like computer system that is capable of: being: (1) opened like a notebook, (2) quickly disassembled and re-assembled, (3) used for handset/earset communications relay operations and (4) used in a wide variety of computing, collaboration, communications and conferencing applications.

Inventions described herein are based on several Disclosure Documents submitted to the U.S. Patent and Trademark Office, including Document No.s 353691, 363753, 368165, and 377365. Inventions herein solve several prior art shortcomings, resulting in new modular integrated computer systems. The inventions as described below can be quickly configured to desktop, notebook, wireless and/or PDA embodiments. Thus, the user will be able to purchase a single computer system and pay much less money than conventional systems.

## SUMMARY OF THE INVENTION

An object of this invention is to provide a modular multiple function display-computer system, where one can use the same relatively high resolution color flat panel display in both a desktop and mobile environments.

5 Another object of this invention is to provide means to reduce the cost to the customer of owning several expensive computer systems, by combining in one system the capability of performing both office desktop and portable/mobile computing and communications applications. Thus the invention herein saves the user the expense of purchasing separate computer systems for desktop uses, notebook computer uses, PCS uses and PDA uses.

10 Still another object of this invention involves means to quickly configure a modular notebook or PDA-like computer system into a plurality of system configurations for personal computer and wide area communication operations.

15 Another object of this invention is to provide for a relatively thin and light weight computer unit to be carried under one's arm in a notebook-like fashion, yet have sufficient computing power to execute a wide range of conventional computer and communications applications.

Still another object of this invention is to provide for bi-directional communication of voice, audio, text, graphics, image and/or video data to wide area communications networks where one or more users may communicate with other users with appropriate apparatus. The communication may realtime or store forward type communications.

20 Another object of this invention involves hardware and program software to control cellular or PCS communications, combined with a light weight mobile notebook or PDA like unit. The unit or system would act as a computing platform and base communications relay station. The system or unit may then relay voice and data to/from a handset unit or earset unit, where the base unit relays the this voice and data information to/from a wide area communication network.

25 Still another object of this invention involves means for quick disconnection or disassembly and subsequent connection or assembly of key component of the system, such as battery power unit, communication adapters (modems) and/or wireless telephone units.

30 A still further object of this invention is to use the same display-computer system assembly, comprising of relatively large high resolution color flat display panel and a powerful CPU with large memory, etc., and combining them in a modular fashion with a thin keyboard, battery power source, modem, and wireless communications means.

Another objective of this invention is to provide means for integrated telephony functions on a portable computing platform, with powerful microprocessors running Windows operating systems for a wide range of computing and communication functions.

A still further objective of this invention is to provide for full Internet access on a wireless mobile platform, where the user can access the world wide web and execute most of the available Internet browser functions and plug-ins. The computer system would be capable of performing most of the Internet data access, download, upload and conferencing functions

#### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 shows a perspective view of a portable computer with a notebook clamshell-like structure.

Fig. 2 shows a perspective view of a modular portable computer system in desktop configuration.

Fig. 3(a) shows a notebook like portable computer in an open state.

Fig. 3(b) shows the notebook like computer in a closed state.

Fig. 3(c) shows a handset telephone unit and earset unit.

Fig. 4(a) shows a notebook or portable computer with a protective covering material.

Fig. 4(b) shows an electrical power source unit.

Fig. 5 shows a PDA like unit with a roughly transparent cover half.

Fig. 6(a) shows a notebook or PDA in a partial open state.

Fig. 6(b) shows the notebook or PDA in a reversed open state.

Fig. 7 shows block diagram of the computer system and associated elements.

Fig. 8 shows a flow diagram of the computer system programs and operations.

#### DETAILED DESCRIPTION

Figure 1 shows a computer system, to be operated by a person or user, where the unit has a conventional notebook clamshell-like structure. The computer system as used herein can also be referred to as a portable computer system, computer-display unit or base unit, and shall also include the terms: personal computer, notebook computer, sub-notebook computer or Personal Digital Assistant (PDA). The computer system as disclosed herein typically comprises of a flat panel display assembly 2, which includes a display panel and screen 4 and other components described below. An expandable hinge means 10 connects the flat panel display assembly and cover assembly (8, 9 and 16). Expandable hinge means 10 may be embodied many ways including using flexible material that is corrugated, having its grooves running parallel to the edge of the notebook structure. Cover assembly may consist of two or more sections, such as a first cover section 8, second cover section 9, and a keyboard section 16. One or more of the cover sections may be quickly disassembled from each other by the user. To avoid accidental disassembly, means may be embodied where the user must simultaneously press two push buttons 5, for example one on each side of the structure, in order to disconnect the sections. The portable

portable computer system may also have an inside protective sheet member **4A** attached to the inside the fold of the computer system. Fig. 1 shows a partially open notebook-like structure, but it may be closed all the way shut and secured, by a securing strap means **8A**. This strap means may be secured to the other side of the display assembly **2** by Velcro like strips, for temporary securing and un-securing, with one's fingers. One purpose of this foldable embodiment is to provide the computer user with a handy portable notebook computer that: (1) when closed, one can easily carry, cradled in one hand under one's arm, and (2) easily opened for access to the computer indicators and controls.

The flat panel display assembly **2** may be a monochrome or color liquid crystal displays (LCD), such as those manufactured by Sharp Electronics, NEC Electronics, Toshiba Corporation or others. The display panels screen sizes may be 10 to 14 inches or more in diameter. The display pixel arrays may be 640 by 480 (VGA), 800 by 600 (SVGA), or 1024 by 768 (XGA). Color depth should be six bits, and the response time should be 45 to 50 milliseconds ( $t_{on} + t_{off}$ ). Brightness of the screen should 70 Cd/m<sup>2</sup> and contrast ratio be at least 100:1, where 250:1 is preferred.

LCD panels from Sharp Electronics may be used in the embodiments. Applicable LCD Models include LQ11DS01, LQ12DS01, LQ12DX01 and LQ12X12. These panels have screen sizes of either 11.3 or 12.1 inches measure along their diagonal. Each panel is capable of a color depth of 6 bits/sub-pixel, a response time of 80 ms, brightness of 70 - 150 cd/m<sup>2</sup> and a contrast ratio of 100:1. LCD panels from NEC may also be used, such as NL10276BC24-04, NL8060BC31-02, NL8060BC31-01, and NL8060BC29-01. These panels are capable of 6 bit color depth, 50 ms response time, 70 cd/m<sup>2</sup> brightness and 150:1 contrast. Toshiba panels that may embodied include: LTM11C016, LTM12C236, or LTM12C25S, which are capable of 50 ms response, 70 cd/m<sup>2</sup> brightness and 100:1 contrast. Manufactures' references and manuals for each are hereby incorporated by reference.

Several I/O slots and/or connectors may be embodied at one or more edges of the flat panel display assembly **2**. Fig. 1 shows access slots to a floppy disk **28**, external communication means **27**, printer connector **31**. Other external connection means may be embodied. Several connector means may be embodied, including auxiliary video connector, COM ports, and/or mouse/game ports. PCMCIA PC card **40** may be included for adding fax/modem, network interface (wire or wireless) external communications and/or added memory. An integrated built-in transmitter receiver and a retractable antenna **32** may be embodied, for example to the flat panel display assembly **2**. The antenna and associated RF transceiver may be used for wireless communications to/from an external communication network. Many of the well-known notebook computer or personal computer I/O devices may be embodied.

An important feature of this embodiment is the dimensions of the computer-display unit. It may be made conveniently larger than a 8.5 X 11 inch sheet of paper, so that one can place one or more sheets of paper (or other relatively thin flat objects) inside the closed clamshell like notebook structure in a folding or latching fashion. The user can safely carry papers from location to location without folding or wrinkling them. Thus the unit can act as a carrying device as well as a notebook computer. The outside surfaces and edges of notebook computer may be covered with leather, vinyl or other type of soft material, for easy of hand carrying and surface protection. Other parts may be embodied including foldable short legs **9A** and **9B**, keyboard resting pads **16A** and **16B**, built-in audio speaker(s) **30**.

Fig. 2 shows the portable computer with several parts detached or disassembled. This embodiment may be used in desktop computer system environments. The flat panel display assembly **2** may be placed at an inclined angle, with foldable leg support means **19A** and **19B**. The leg support means may fold relatively flush to the backside of the assembly **2** (motion range **A**) when not in use, via a simple hinge **15**. Vertical portions **19A** and **19B** may slide in and out, in a telescoping type arrangement, to allow wide range inclination angles. A pair of short legs **3** may be placed near the front of assembly **2** that may also fold relatively flush with the back of the assembly. Means may be included to place the screen at a vertical orientation. A pen or stylus input means may be associated with the display screen **4**. The pen or stylus means may include finger input (touch panel) means, where one can write or point to area on the display screen. The expandable hinge means **10** may be removed from the assembly **2** and from the cover section **9** by a quick disconnect or disassembly means **5**. Alternatively, the hinge means may be fixed to parts **2** and **9**. The hinge means may be made of a relatively flexible material, such as leather and vinyl. It may be corrugated as shown in the figure so it can bend easily and expand, as required. The hinge may have a number of attachment slots **12** for the quick dis-attachment or disconnection from hook mechanisms **13**. Fig. 2 shows the flexible hinge means **10** removed from the other assemblies.

Cover section **9** may contain a battery power unit containing one or more batteries and power circuit elements. The battery power unit may be embodied with several types of batteries, including Lithium- ion or NiCd batteries. The power unit may be a self contained battery package, having an easy to read charge indicator **22** that indicates the state of the battery's electrical charge. Because all batteries have a limited useful charge life, the package may be easily and quickly disconnected from the keyboard section **16** and replaced with another battery package. Spare battery packages and other spare parts could be carried in a separate traveling case (not shown). The keyboard section **16** may have a full size QWERTY keyboard with movable tactile keys. An electrical cable **20** may connect the keyboard to the computer-display assembly **2**. Although short cable is shown, it may be a long cable or a flexible cable, so that the keyboard may be moved about if desired. Alternatively, a wireless electro-magnetic link may be embodied

such as infrared (IR) or RF links, which would replace electrical cables **20** and **26**. The cover section **8** may contain a wireless handset **14**, such as a cellular telephone transceiver. The handset may have retractable antenna, small speaker, keypad, built-in microphone and a battery source. This handset **14** may be capable of analog or digital cellular operation, including AMPS, TDMA, CDMA, PCS, CDPD, or equivalent types for communicating with wide area wireless communication networks. The wireless unit **14** can be easily removed from a cutout or recess area **34** in the cover section **8**. The recess area is made slightly larger than the outside dimensions of the handset **14**, so it can fit inside the recess with a relatively snug fit. It is important the handset be easily and quickly removed and replaced in the base unit. Alternatively, cover section **8** consist of the handset itself, so that a separate cover section with recess would not be required.

The portable computer system's flexible hinge and the cover sections should be made relatively thin so that when the two halves are folded (rotated) closed, it will not be too thick or heavy to carry with one hand. As shown in Fig. 1, legs **3**, **5**, **19A** and **19B** may be folded roughly flush with outside surfaces of the unit. The number cover sections are not limited to three. The cellular handset is shown in Fig. 2 may be connected to the computer system by an optional electrical cable **26**. A RF transceiver in the wireless telephone would serve as the transceiver for the computer as well. This embodiment might be desirable to reduce the overall cost of the system. However, a wireless RF transceiver and modem may be located in the flat display panel assembly **2** for voice or data communications. An antenna may be embodied on the display assembly **2**, with a retractable antenna **32**. The display assembly may include the computer system located within the assembly housing. The advantage of this later embodiment is that the telephone **14** and computer system could be operated independently.

The portable computer system may also have means for connection to a non-battery power source, as shown in Fig 2, via a standard power line cord and plug **28**. The system may also have means for connection to an external wire based wide area communications network **33**, via cable **29**. The wire based wide area network may include one or more telephone networks, cable TV networks and/or computer LAN/WANs. Telephone networks may include POTS, ISDN, ATM or other equivalent types. Several computer interface connection means may be embodied, for example interface slots/connectors as shown (**27**, **31**, and **38**). These interfaces might include R/S 232, USB, IEEE 1394, PCMCIA, or other computer I/O (serial or parallel) connections. Useful connections may include a bus extender connection, so that the notebook computer can be interfaced to another more powerful computer. For portability reasons, it is desirable that the modem or digital terminal adapter be built into the computer system unit. Some means for software loading should be included such as a floppy disk or smart card. Internal mass memory of the computer system could include ROM, flash memory, or other memory means. Means for accepting PCMCIA cards, ROM cards or other types of memory card may be implemented.

Preferably, the system may be embodied with a very small light weight and low power mini hard disk. One or more IR communications interfaces may also be implemented.

Other capabilities such as FAX send/receive, speech recognition, voice processing voice mail, telephony, and E-mail functions may be implemented in the computer system. A built-in microphone **36** and speaker **30** may be embodied to support speech input/output and multimedia functions. Preferably the display should be capable of full color with a wide viewing angle. If the display is back lit, the user should be allowed to switch the backlight "on", "off" and to a multiplicity of levels in between. The operating system of the notebook/PDA should be a GUI type such as Windows™ 3.1/95, Windows CE™, MagicCap or another suitable GUI based computer operating system. The system should can be designed to support wide range of communication connectivity and software compatibility.

*the*  
Figs. **3A** and **3B** show another embodiment of invention having a base unit or notebook computer system **100**, a handset unit **14** and a earset **34**. This embodiment shows a relatively thin flat display panel assembly **2** having a display screen **4**. The system may also include a pen and/or finger input means **7**. The base unit has an expandable hinge means **10** physically connecting the display assembly to the other half of the base computer unit. The other half can be comprised of several sub-assemblies including a battery power source section **9**, keyboard assembly **16** and an electronics housing section **8**. The keyboard assembly contains a keyboard unit **16A**, which may contain a full-size QWERTY keyboard unit. The housing section **8** may include a wireless modem or communications adapter means. The expandable hinge means **10** should have an easy access locking and unlocking means **10A**, which can temporarily lock the rotation of the two halves at the user's desired angle. Electronic housing section **8** may be attached edge wise to the keyboard assembly **16** by a quick attach and release connection means. As shown in the figures, several assemblies can be disassembled by pressing one or more finger access tabs **5**. Likewise, a battery source section **9** may be edgewise connected to the opposite edge of the keyboard, via similar quick attach and release connection mechanism having finger push tabs **5**. The tabs may be located on each side of the assemblies for quick and easy, but safe, user disassembly. The connection means may include means for secure physical attachment and connection of electrical wires, located inside the subassemblies. Although the sections may be ridge, the attachment mechanisms may be may somewhat flexible, elastic or pliable, so that the combination of assemblies can bend slightly.

Battery power source unit **9** may consist of one or more batteries with voltage regulation, AC/DC operation, power management circuits and charging circuitry. In a preferred embodiment the unit should be capable of accepting electrical charge from an AC line. A important feature embodiment of the invention is means for quickly interchanging an electrical power depleted battery power unit **9** with a freshly charged battery unit. This may be accomplish

by a combination of finger push tabs 5, latches and hook means for quick disconnection and re-attachment. In one intended scenario a user may carry several spare battery packages in a separate briefcase. When the attached battery package is depleted, the user can quickly changed out the battery sections. The user can then plug the depleted battery package into an AC line for a built-in charging operation.

It is preferable that each of the major assemblies and sub-assemblies be made relatively thin for easy carrying. The expandable hinge means should be made somewhat flexible, elastic or pliable so that the user may place relatively thin flat objects inside the folded space of the notebook- like unit. These thin objects may include sheets of paper, cards, brochures, or similar relatively then flat items. Linkages between the sections may be made somewhat yielding, pliable, elastic and/or stretchable. Although the display device may be ridged, the other half of the notebook may be embodied with thin flexible enclosures and other structural components. Also, the flat panel display device and assembly 2, 4 may be made flexible. Thin and flexible keyboards are known to those in the art. The other parts may be adapted to have thin and slightly flexible mechanical features. The two halves can be closed by hand and secured by a flap and snap means 43 or equivalent means. As discussed above, the expandable hinge means 10 may be made flexible and expandable by incorporating a multiplicity of small folds or other equivalent means. If the user places thin objects between the halves of the base unit, one or more sides could bulge out slightly, improving the physical object carrying capability of the notebook computer. This object carrying capability is an important feature for mobile users who may be carrying the notebook almost everywhere they go. The user may securely place and Tatch paper sheets, letters, memos, or other flat objects inside the notebook clam shell structure. A base unit hinge locking and unlocking means 10A may also be embodied, so that the user can quickly and easily temporarily lock the two halves of the unit to a rotationally fixed state (and later un-lock them).

Fig. 3(a) also shows several other elements including a small CCD video camera 46, built into the display assembly for video conferencing and other uses. One or more built-in audio microphones 36 may be embodied in the base unit. Preferably one microphone should be located on the edge of the notebook, as shown, so that the user may be in voice communications with other while the unit is closed. One or more audio speakers 30 may be built into the base unit. One or more compartments 47 and 48 may be embodied at convenient locations to store attachments for use with the mobile computer system. A telescoping antenna 32 may be embodied into the base unit as shown, or it may be built-in the unit and not exposed. Although the base unit 100 can be a self-contained unit, it may work with other optional attachments, such as a wireless cellular-like handset 14 or earset 34. The handset 14 may operate roughly equivalent to conventional cellular telephone handsets with a built in power source, providing voice and/or data communications to wide area communications networks. The earset 34 has a small low power



RF transceiver, audio microphone, audio speaker and small battery source, which is capable of fitting into the user's ear. The wireless earset unit may be used for hands free applications. The user may then walk around while communicating with the handset or earset. If one is using the earset he/she may also use a pen input means **7** or keyboard **16** while in audio communications.

5 For semi-private voice communications, some users may prefer using the handset **14**, with handset speaker **14A**, handset key pad **14B** and handset microphone pickup **14C**

If one is using the handset or earset, the base computer unit **100** may be placed some distance away from the user, typically in the same room or nearby room. The base computer unit may be designed for a higher transmitting power level. The base unit may be designed to allow the user to switch between a high or low level transmitting and receiving power levels. The earset **34** or handset **14** can be designed for a much lower RF transmit and receiver electrical power levels, because the base computer unit **100** can be place a relatively short distance away (typically from a few feet to about fifty feet). Thus, the base unit **100** may relay RF communications between the handset or earset and an external wide area communications network. The base unit could safely embody a more powerful RF transmitter resulting in a larger signal to noise ratio. This will result in improved wireless communication to and from wide area networks that may have antennas several miles away. A very important advantage of this invention is that the user has the option of having very low electrical power electromagnetic fields near his/her's head, thus improving the health and safety aspects for the user. Since less power is required for the handset **14**, it can be thinner and smaller then a standard cellular handset. Thus the handset can be smaller and easier to place in the user's pocket. The earset can be made vary small so that the users can leave it in his/her's ear for long periods of time and have one's hands free for other uses.

Fig. **3(b)** shows the base unit computer-display unit **100** in a closed configuration, in which one may carry it under one's arm. Since the unit is typically battery powered and contains electronics for a wireless voice and PCS like operations, one could use it for voice/data communications while carrying it about (i.e., in transport). The user may speak towards one or more microphones **36** located along the top edge. The user will be able to hear the other person(s) talking, through audio speakers **30** located conveniently on the base unit. A small telephone keypad could be located behind a protective door **41**, for convenient dialing of a telephone number. The door may be a simple sliding door device or mechanism. The antenna **32** may be a sliding telescoping type. A simple display indicator **22** may show the electrical charge state of the battery source. A plurality of switches and indicators **46** may be located along one edge of the base unit for easy viewing and access. Such switches and indicators may include: an On-Off switch, Mode Switch (for voice, data, and video modes, etc.), high/low power transmit switch, ring/alarm mode and/or speaker/mic mode (for earset, handset, etc.). For securing the two halves of the base unit, a flap **43** made of a simple expanding material, which may include a snap means at one end and may be secured with a pin and/or pivot means. The flap would then

snap to secure the flat panel display assembly **2** and cover assembly (**9, 16, 8**). In Fig. **3(a)**, the flap **43** is shown rotated in the opposite orientation for clarity only. Other securing means may be embodied that are known to those in the art.

Fig. **4(a)** shows the portable computer system or computer-display unit **100** covered with a thin soft protective material or film, such as leather or vinyl. This material will protect the unit when it is bumped and/or banged into hard objects while in use in the field or office environments. The protective material may have a texture or roughen surface (as indicated in the figure), which would also provide for a relatively high mechanical friction; so it will be easier to carry under one's arm. Holes or cutouts may be embodied in the protective cover for viewing and/or using the various indicators, switches and keypads. A zipper securing means **45** may be embodied with the notebook, as shown in Fig. **4(a)**. The zipper means may be attached to the leather or vinyl covers so that the unit can be zipped closed to secure and protect objects placed inside the notebook. A pull tab **45A** of the zipper means is shown in the figure. This embodiment would be especially applicable in rugged or harsh environments. A strap **50** may be attached to the unit so that the user may temporarily store it on a hook for example. Fig. **4(b)** shows an embodiment of the battery power source section **9**. As in previous embodiments, it may be detached from the notebook computer-display unit. A spring loaded pull out power cord **9B** may be embodied, so that the user can conveniently pull out the power cord to electrically charge the package. The power cord and plug may be easily retracted inside a cutout space on the side of the subassembly. Several adjunct attachments and/or accessories may be carried in small compartments in the notebook unit. In addition, accessories and attachments may be carried in a separate briefcase or like carrying case (not shown in the figures). Such accessories may include a line power supply and cord, extra battery power source section **9**, spare earsets **34**, spare handsets **14**, external hard drive, external CD ROM drive, external mouse, spare styluses and/or spare video camera/lenses **46**.

An important advantage of this notebook computer unit invention is that it can be operational when it is in the closed configuration. Thus, while carrying the unit in one's hand or under one's arm, the user can perform voice, data and/or video communications. The notebook unit can be used in an open configuration on a desktop, airline tray or wide variety of other computing environments. The unit can be configured for wire based or wireless communication operations. The unit can be used for general purpose computing, network computing, pen input computing, PCS/Cellular, data/video conferencing, on-line network computing and data collaboration applications. The notebook unit can be used as a personal organizer or personal information manager, such as a computer equivalent of the Franklin Planner™ or equivalent planners. A multiplicity of personal computing applications may be embodied on its computer. The unit may be capable of wire or wireless communications, linking it to multiple handsets and earsets. The notebook computer unit may have a plurality of electrical connectors along the edges

or other convenient locations for connection to a plurality of external devices, including but not limited to: modems, network interface cards, hard disks, floppy disks, and bus extender enclosures.

Preferably the notebook assemblies should be made relatively thin and light weight that would be an advantage in mobile use. For example, the flat panel display assembly 2 should have a thickness of roughly 0.75 inch or less. The cover assembly may be comprised of the battery power source section 9, keyboard assembly 16, and external communications section 8 should have a thickness roughly 0.75 inch or less; so that the folded total thickness of the unit could be 1.5 inches or less. However, an overall thickness of one inch (i.e. 0.5 inch for each half), or less, may be preferred. A keyboard unit located in keyboard section 16 that may be Model KFNR available from Alps Electric Co. Ltd. This keyboard unit has a thickness of 10 mm, a 3 mm key travel, a 1 mm over travel and a minimum key pitch of 18 mm. Alps Electric also has introduced a 7.5 mm height keyboard assembly a full size keyboard, capable of high speed typing without operator tiring.

Fig. 5 shows another alternate computer notebook embodiment, consisting of a somewhat smaller size flat panel assembly 2, display screen 4, pen/stylus means 7 and a roughly transparent display panel cover 17. The flat display panel could be an LCD, FED, or other type of flat panel display. The panel cover 17 could be made of a hard rigid material or a durable soft polymer material that is roughly transparent to a range of electromagnetic radiation frequencies. This cover may be made optically transparent to let the ambient room light to impinge onto a plurality of photoelectric light sensors 41A, 41B and 41C, which may be placed onto the display panel assembly 2. The photovoltaic or photoelectric light sensors may convert ambient room light to electrical voltages. These sensors may provide power energy to power the unit. The sensors may also help change the unit's battery source. Thus, with the roughly transparent cover 4 closed over the display panel assembly, some light rays will be transmitted through the cover. Photons from the ambient light are converted to an electric voltage, via the sensors and energy conversion circuitry that is applied to the computer unit's power source. Even if the computer unit is turned off and cover closed, the sensor could still be charging its batteries. The roughly transparent cover 17 may be made flexible layers of polyester, polycarbonate or other suitable materials. An advantage of this embodiment is an improvement in maintaining power to the notebook unit for longer periods compared to prior art battery powered units. Information on the display screen may be viewable even with the cover 17 is closed over the flat panel display assembly 2. Viewing of the display screen with the cover closed is an improvement over the opaque covers of conventional notebook computer and PDAs.

Fig. 6(a) shows another embodiment of a thin light weight notebook computer or PDA unit. The cover panel 17 contain a keyboard 16A, which may be a membrane type keyboard.

The flat panel display assembly **2**, with its display screen **4**, is attached to the cover panel **17** by an expandable hinge means **10**. The hinge means, which may be elastic or pliable, should be capable of being rotated over angles A. The hinge means should be capable of rotating through roughly 360 degrees, so that the two halves may be folded back onto each other as shown in Fig. **6B**. In the configuration of Fig. **6B**, the notebook unit can be held in one's arm, and the display screen can be written onto by a stylus or pen. The unit could also be placed onto the table or desk for convenient viewing. The cover keyboard assembly **17** can be closed to hold loose sheets of paper, brochures, etc. In this latter case, the size of the panel halves should be slightly larger than 8.5" by 11" to facilitate one carrying loose sheets. Expandable hinge means **10** is designed to expand to accommodate a relatively thick stack of documents. Hinges may be made of pressed pliable corrugated plastic sheets can accommodate 0.5 inch or more gaps.

Various battery power sources **9** may be used in the above embodiments, including smart-battery technology having rechargeable batteries. They may be made capable of monitoring themselves for electrical charge level. Batteries that are suitable for this smart battery technology include nickel-metal hydride (NiMH) and lithium-ion (Li-ion) types. NiMH batteries are more sensitive to overcharge than NiCd batteries. Care must be taken to avoid overcharging that causes heating, which is damaging to the NiMH cycle life and capacity. Li-ion batteries require tight battery management for safety purposes. NiMH batteries are available from Sanyo Energy USA. Several power management and smart-battery devices are available. Duracell has a smart rechargeable battery with intelligent power management circuits for charge level gauge means, as disclosed above. The gauge may constantly show the state of the total battery charge. Advantages of an intelligent battery management system include customer notification of charge state, longer mobile operation times, longer battery lifetimes, and faster charge times. The rechargeable battery and power management circuit may collect and communicate the present and predicted battery data to the host notebook computer under software control.

Wireless communications adapters or modems disclosed in the above embodiments may consist of analog or digital transmitter and receivers, having control circuitry for cellular AMPS, PCS, CDPD, and RF links to wide area communication networks. The communication means disclosed herein may make use of long distance or short distance communications techniques, methods and equipment. Communication techniques may include several types of digital multiplexing and command access schemes such as TDMA, CDMA, GSM, or a combination thereof.

Fig. 7 shows a block diagram of the system elements and associated circuitry, hardware, firmware and software. A microprocessor **38** controls most of the system elements. A computer system I/O bus **60** is shown interfacing several system elements. Many types of microprocessors may be embodied, including 16, 32 or 64 bit processors. The microprocessor

may a complex instruction set computer (CISC) or a reduced instruction computer (RISC) computer types, or a combination of the two. CISC microprocessors that may be embodied, including the Pentium P5 manufactured by the Intel Corporation, the 68000 series microprocessors made by Motorola Corporation. Many types of RISC processors may be embodied, including the ARM series, the UltraSpac by Sun Micro Systems, the SH Series by Hitachi, PowerPC by Motorola and IBM and the MIPS R4000 series by several sources. The above manufactures' references and manuals are hereby incorporated by reference. Since electrical power dissipation is very important in portable systems, RISC microprocessor may have an advantage with smaller transistor counts, low voltages and fully static designs. RISC processors are available at an operating voltage of only 2.0 volts. RISC processors using 0.5 micron CMOS processes have resulted in die sizes for core functions of roughly 4 mm<sup>2</sup>. RISC processors can deliver 300 - 400 Mips/W. Microprocessor 38 may support several types of I/O buses (typically 32 bit wide), such as VL or PCI type buses. Microprocessor and I/O busses are well known to those skilled in the art.

A Microsoft Corporation's Windows® operating system software may be embodied in the computer system. For these systems, the microprocessor CPU should be at 32 or 64 bit processors, capable of clock speeds in the 100MHz or more. The microcomputer system may also consist of one or more I/O port means 62. A PC Card interface 27 may be embodied for bus expansion, extended memory or other added circuitry having access to the main bus 60. A mass memory device 42 may be embodied in the system, which typically is a magnetic disk memory hard drive. Many devices may be connected to the computer system, including a smart card interface 46 and keyboard 16. A touch panel and pen input means 7 may be embodied in the system, which may be separate or integrated. Examples of such touch pen devices are available from Elo Touch Systems Inc. in Oak Ridge, TN, MicroTouch Systems Inc. in Methuen, MA, and Carroll Touch Corp. in Round Rock, TX. Pen and touch panel combinations means are available from Scriptel Corp. in Columbus, OH for the tablet, and Symbiosis Logic in Colorado Springs for an IC controller. Other pen and touch devices are available from Phillips Semiconductor, Sunnyvale CA. Other more traditional cursor control devices 56 may be embodied, such as a mouse, trackball, touch pad, or force transducer. Preferably, most of these components should be sufficiently small as to fit into relatively thin display assembly 2.

The flat display panel device 2 is be interfaced to the system bus 60 through display controller circuitry 44. Preferably, the display controller should be capable of VGA or SVGA display formats. Integrated into the display controller may be a BitBlit engine (to accelerate graphics), RAMDAC memory, clock synthesizer and display frame buffer. A digital signal processing (DSP) co-processor 48 may be embodied. The DSP may accept data from many sources including a microphone 36 and video data source 43. The DSP or microprocessor may output signals to one or more audio speakers, as shown as 10A and 10B. Video data may be in

either analog or digital form. Microphone 36, and speaker(s) may be embodied in the handset or earset of the previous figures. Video data may be pre-processed by a the DSP. Video sources may include output from video cameras, VCR, broadcast TV, satellite TV or cable TV.

External communication means 54 may be connected to the bus, which may be capable of fast two way data transfers. The communications means 54 should be capable of controlling communications to and from a plurality of wire and wireless communication systems. These include wire based telephone means 53 and wireless communication means 51. The system may include an antenna means 32 for transmitting and receiving electromagnetic radiated signals. External communication means may be connected to one or more information or communication service providers. These service providers may include telephone services (RBOCs, LEC), on-line computer networks, Internet service providers, cable MSOs and/or long distance telephone firms. They also may include cable TV companies, satellite TV service, and LAN/WAN communication network providers. The external I/O port means 62 may be connected to a Universal Series Bus (USB) and/or an IEEE 1394 (Firewire®) type I/O bus.

Fig. 8 presents a typical flow diagram of computer programs executing in the system of the embodiments disclosed herein. After a power-on action 60, the system may enter a standby power on mode 62. A power management program 66 may then be execute followed by a self diagnostic routine 68 that tests the major hardware and firmware elements of the system. If the test fails, a failure report 66 may be generated and either displayed or stored. If the test passes, the operating system (OS) 70 may be loaded and executed. With the OS loaded successfully, the system waits for incoming data and/or voice calls 72. The system may automatically enter a default system mode, or the user can select one or mode computer or communication modes 76. The user has the option of selecting several operating modes, which may include a conventional computing mode 78, a wireless data communications mode 80, and a wireless voice communications mode 82. A conventional computing mode includes typical PC computing or PDA computing. While in any of the above modes, base unit to external communications operations 79 may be controlled, which includes data/voice wire and wireless options. Control code 81 may control the bi-directional handset or earset to base unit communications operations. These operations may execute roughly simultaneously or on a time shared bases, as indicated by connection 83. Under program control, either the wireless handset or the earset may communicate data first between the base unit, then the base unit may relay the data to/from the external communications network. The above communications may involve two way or bi-directional communications, including many types of data (including text, voice, graphics, video and/or images).

Many types of computer application programs may be executed by the computer system. For example, one or more telephony programs 84, office/personal productivity programs 86, electronic mail or voice mail 88, and Internet/Web browsing programs 90 may be used. Other

PDA, PC or workstation programs may also be executed. One or more programs (algorithms or routines) **96** may be used to control this multiple program or system modes; this may include program coordination, scheduling and execution. Programs to control the mobile communications relay functions **98** may be embodied. Users may have the option to exit the application programs **100**. Typically, after the applications have been closed, the user may exit the operating system **102**. After the system exits the OS, the system may still may be in a standby power mode **104**, in which the system can answer and process incoming calls, plus service other requests for other processing tasks. Users may have the option of turning off (or removing) all power to the unit **106**.

It should be further understood that, although a preferred embodiment of the invention has been illustrated and described herein. Changes and modifications can be made in the described arrangements without departing from the scope of the appended claims. Other embodiments, additions, and improvements will be obvious to those with an ordinary skill in the relevant art.

I claim:

1. A portable computer-display unit with a cover assembly hinged at one edge and adapted to a clamshell-like notebook structure for conventional computing and wireless data communications to external wide area communication networks, wherein the computer-display unit is made relatively thin and light weight so that users have the option of carrying it under his/her's arm for long periods of time, the portable computer-display unit comprising of:

a. a flat panel display assembly having a flat panel display device, microcomputer system means, support electronics and assembly housing;

b. expandable hinge means attached at one edge of the flat panel display assembly housing;

c. a cover assembly roughly the same size of the flat panel display assembly, attached at the opposite edge of the expandable hinge means; and

d. said expandable hinge means adapted so that users can place relatively thin flat objects between the flat panel display assembly and the cover assembly, wherein the expandable hinge means will expand to accommodate to the thickness of said thin flat objects.

2. A portable computer-display unit of Claim 1, in which the expandable hinge means is adapted for relatively large rotations of the cover assembly and display assembly, wherein the user has the option to rotate the two assemblies nearly 360 degrees with respect to each other, so that the inside surfaces of the clamshell-like computer-display unit becomes the outside surfaces, and the computer-display unit can be placed on end for near vertical display panel viewing.

3. A portable computer-display unit of Claim 1, further comprising wireless communications means electrically interfaced to the microcomputer system means located inside the flat panel display assembly housing, wherein the computer-display unit is adapted for bi-directional voice, text, graphic and image data communications to and from external wide area communication networks.

4. A portable computer-display unit of Claim 1, in which the flat panel display assembly and expandable hinge means are adapted for quick dis-attachment from each other, and also adapted for quick re-attachment, at options of the user.

5. A portable wireless communication system including a microcomputer system to be operated by a user for voice and data communications to and from external wide area communications networks, the wireless communications systems comprising of:

a. means for base unit wireless communications, comprised of a microprocessor, transceiver and flat panel display, wherein the electrical power of the basic unit means is sufficient to communicate with external wide area communications networks;



b. means for handset communications adapted to communicate with the base unit wireless communication means, via electromagnetic radiation means, wherein electrical power of the handset unit is substantially less than the power the base unit means;

c. the said base unit performing a communications in a bi-directional manner, relaying data between the handset means and the wide area network, wherein the lower power handset is normally placed next to the user's ear during voice communications, but the user has the option to place the higher power base unit several feet away from the user, such as in the same or nearby room.

6. A portable wireless communication system of Claim 5, in which the means for handset communications is replaced by means for earset communications for lighter weight and hand free operations by the user.

7. A portable wireless communication system of Claim 5, in which the user has the option to switch the electrical power level of the handset means to either high power levels for communications directly with the wide area communications network, or switch to lower power levels for communications to the base unit means.

8. A method for portable computing and wireless communicating of voice and data to and from external wide area wireless communications networks, the method comprising the steps of:

a. transmitting data means to external wide area wireless communications networks from a portable base unit means, comprised of microcomputer means, wireless transceiver and flat panel display, via electromagnetic radiation means, wherein the electrical power of the portable basic unit means is sufficient to communicate with wide area wireless communications networks;

b. receiving data from a wide area wireless communications network to the base unit means, via electromagnetic radiation means, wherein the electrical power of the basic unit means is sufficient to communicate with wide area wireless communications networks;

c. transmitting data to a handset unit from the base unit means via electromagnetic radiation means, wherein the power of the handset unit is substantially less than the power of the base unit means;

d. receiving data from the handset unit to the base unit means via electromagnetic radiation means, wherein power of the handset unit is substantially less than the power of the base unit means; and

e. said base unit performing bi-directional relay communication functions between the handset unit and wide area wireless communications networks.

9. A method for portable computing and wireless communicating of Claim 8, in which the user has the option to execute a plurality of application programs on the microcomputer means,

typically including telephony programs, personal productivity programs, e-mail programs, voice mail programs, Internet programs and other conventional PC programs.

10. A method for portable computing and wireless communicating of Claim 9, in which execution of the application programs, voice communications operations and data communications operations are performed on time shared basis, so that the user has the option to perform a plurality of communication and computing tasks, roughly simultaneously.

11. A portable system for conventional computing and data communications to and from external wide area communications networks, wherein the system is made modular and is adapted for quick disassembly and quick re-assembly by a user, the portable system comprising of:

- a. a base unit assembly having a display device, microprocessor system means, support electronics and assembly housing,
- b. a second unit having multiple sections including a keyboard unit, battery power source and support electronics;
- c. means for external data communications, including RF transceiver means interfaced to the microcomputer system means, which controls wireless RF communications to and from external wide area communications networks; and
- d. said base unit and second unit sections adapted for quick disassembly and re-assembly means, wherein the user has the option to configure the portable system to a plurality of configurations, including portable configurations or desktop configurations.

12. A portable system of Claim 11, in which the quick disassembly and re-assembly means are comprised of finger push tabs that the user has the option to press to release latching means located at the mating edge of the base unit and the mating edge of the second unit sections.

## **Modular Notebook and PDA Computer Systems for Personal Computing and Wireless Communications**

### **ABSTRACT**

5 A small light weight modular microcomputer based computer and communications systems,  
designed for both portability and desktop uses. The systems make use of a relative large flat panel  
display device assembly (2), an expandable hinge device (10), battery power source (9), keyboard  
assembly (16), and wireless communications devices (32, 51). The systems are capable of  
10 bi-directional realtime communications of voice, audio, text, graphics and video data. Both  
wire-based or wireless communications methods and devices are implemented. Wireless  
communications devices may include one or more telephone-like handsets (14) and/or earset (34).  
The wireless communication devices may include one or more antennae (32). Systems can be  
configured in a portable arrangement similar to conventional notebook computers, but can be  
quickly and easily disassembled and re-assembled for office desktop uses. Systems may consist of  
15 a base computer unit (100) comprising wireless communication devices may act as a relay station  
relaying voice and other data between the handset or earset and external wide area  
communications networks. The system may be capable of performing, personal digital assistant  
(PDA), cellular telephone, conventional notebook computer, desktop computer functions.



# FIGURE 1

[illegible]

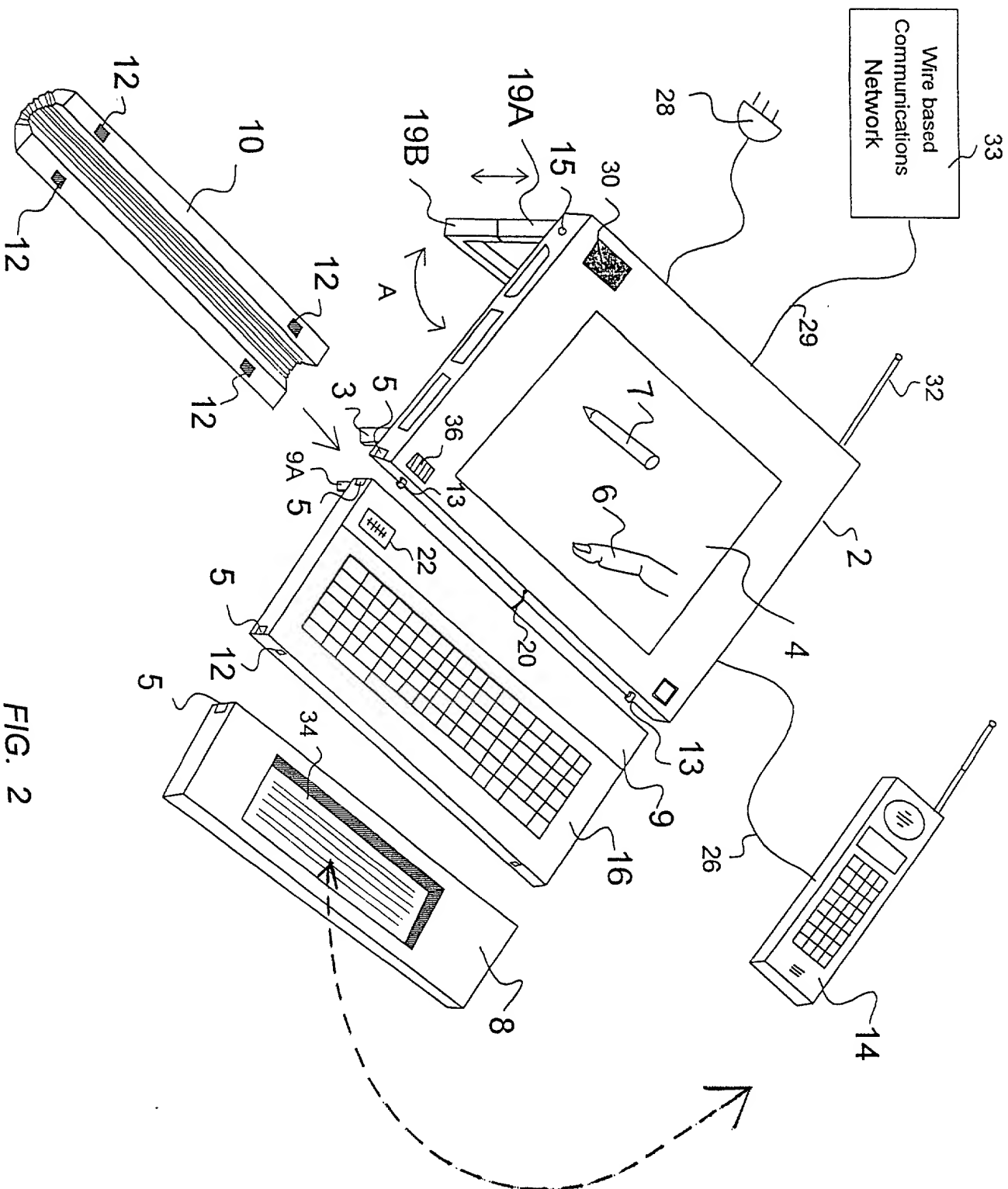
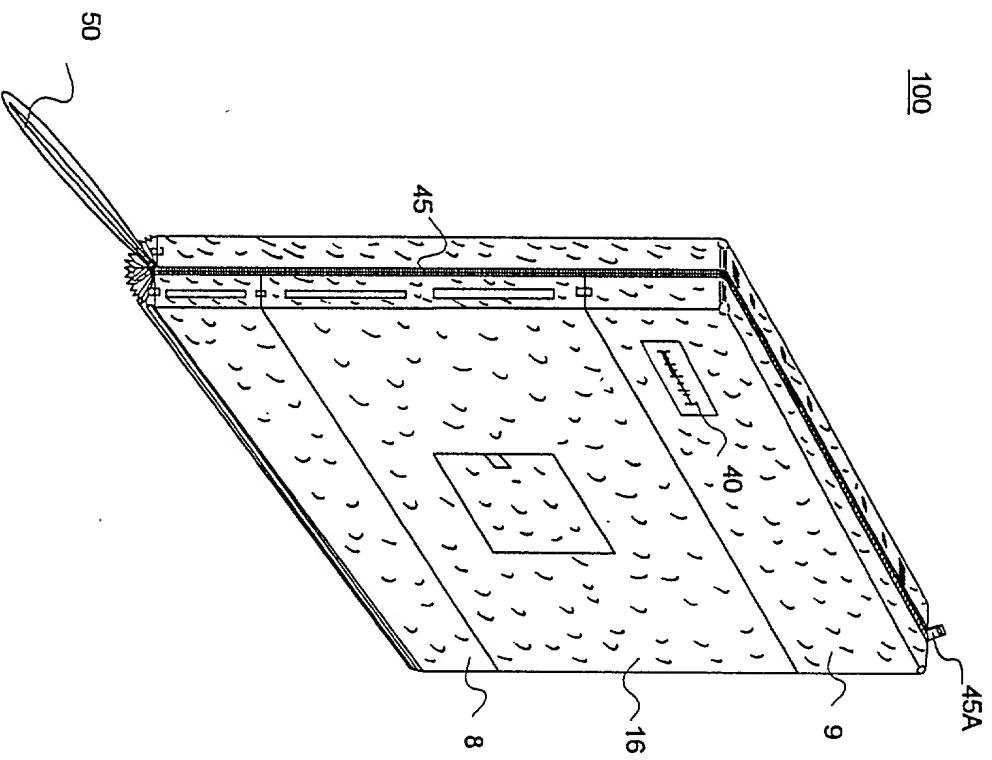
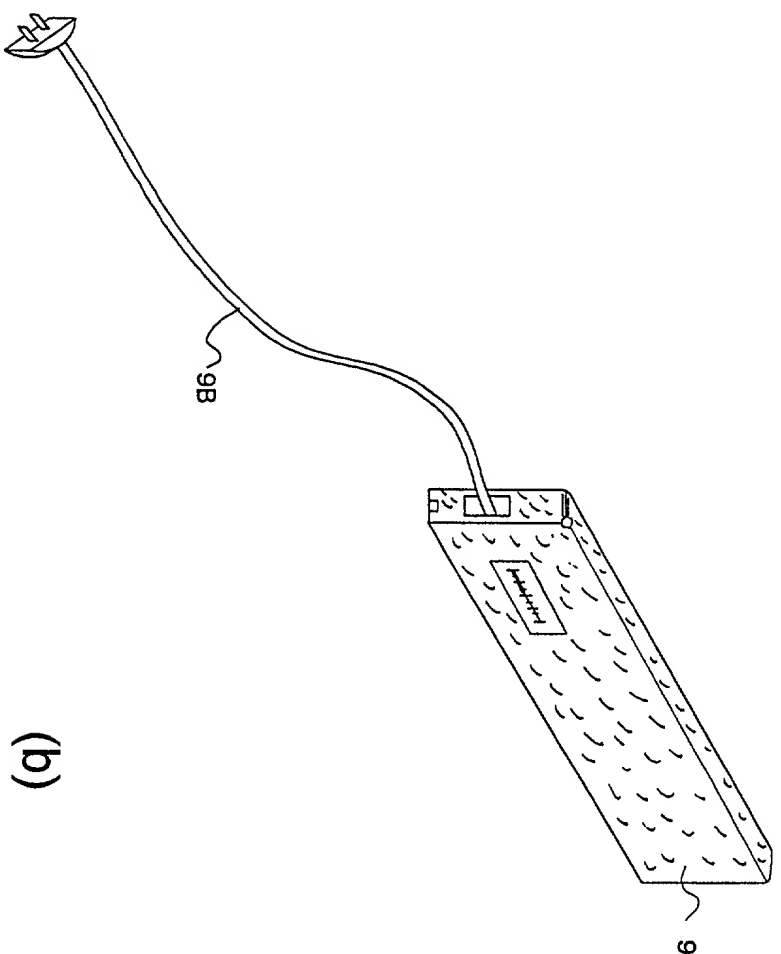


FIG. 2



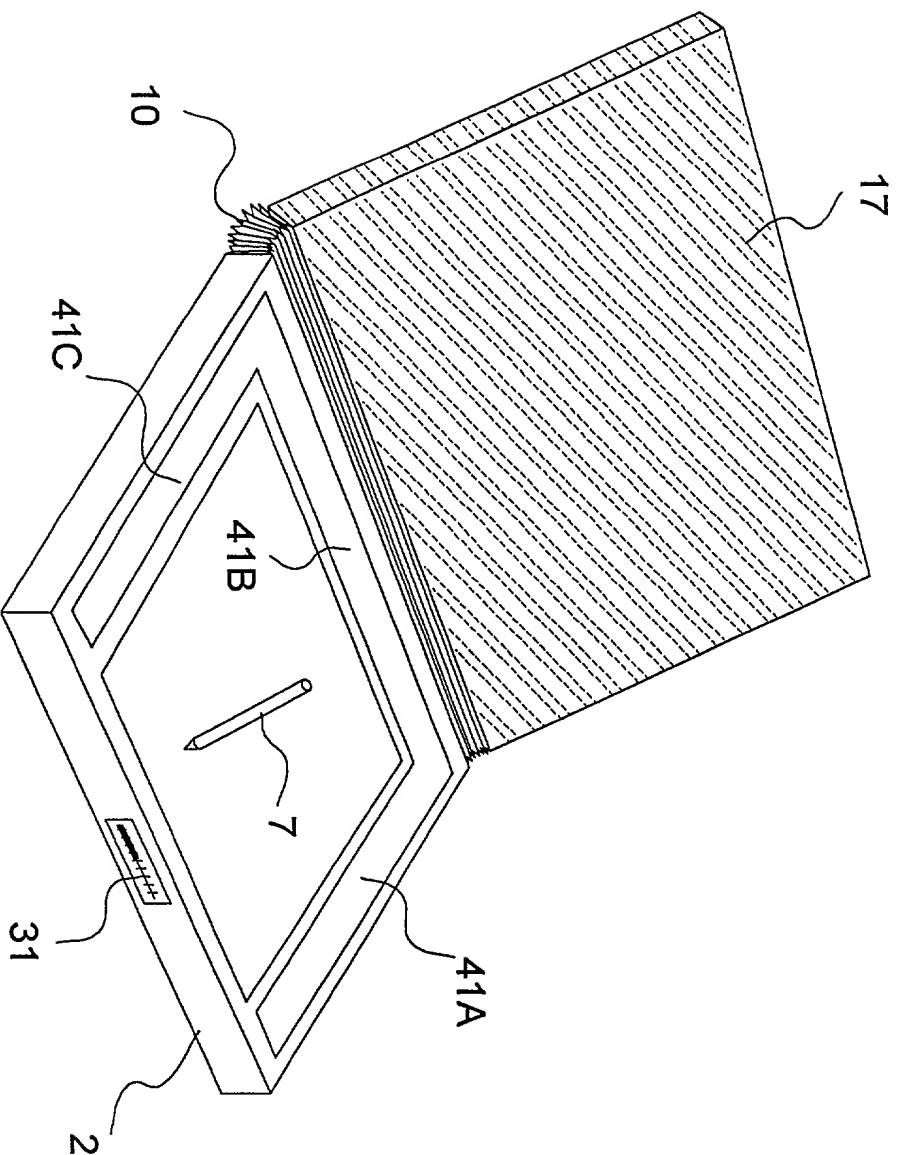


(a)



(b)

FIGURE 4



**FIG. 5**



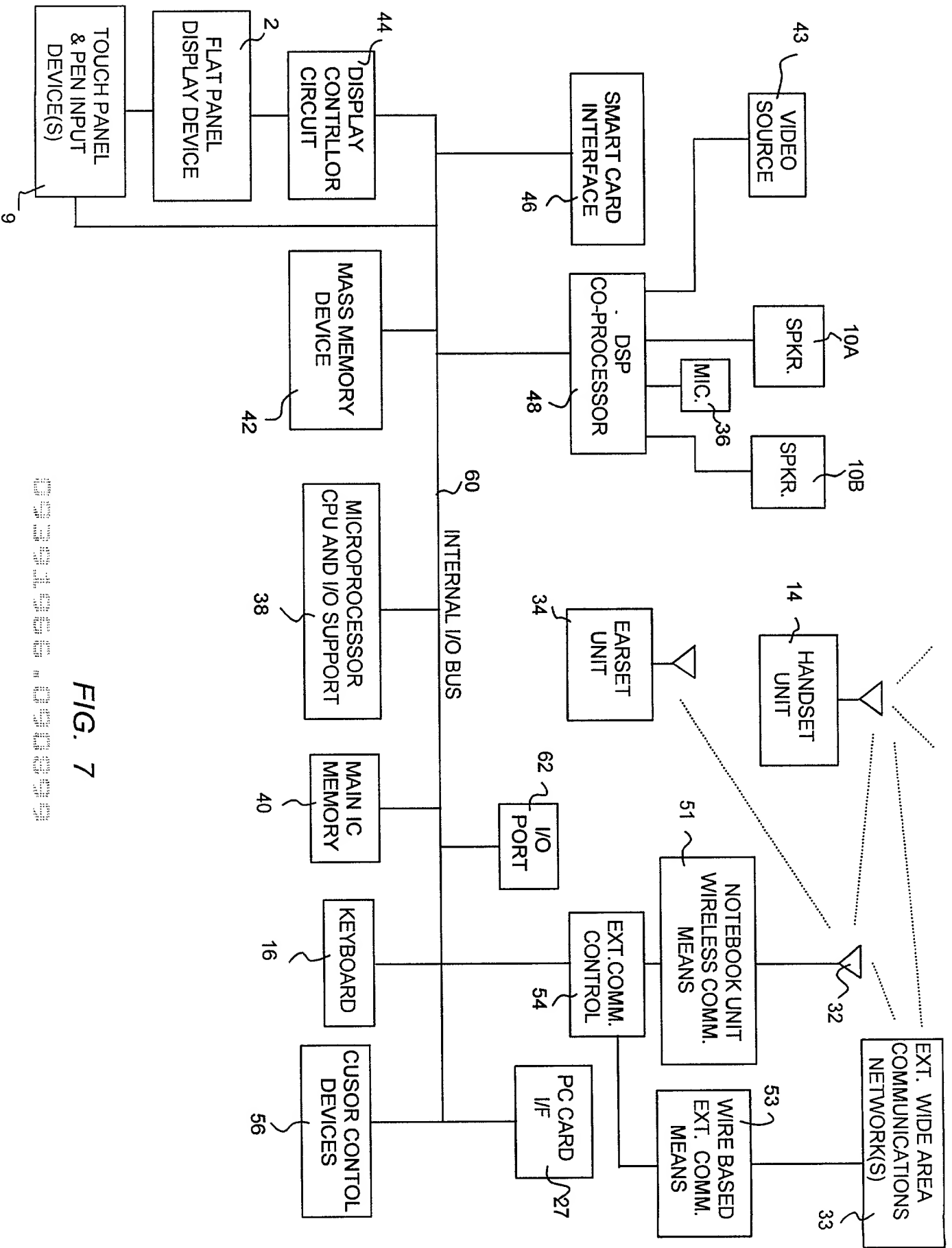


FIG. 7

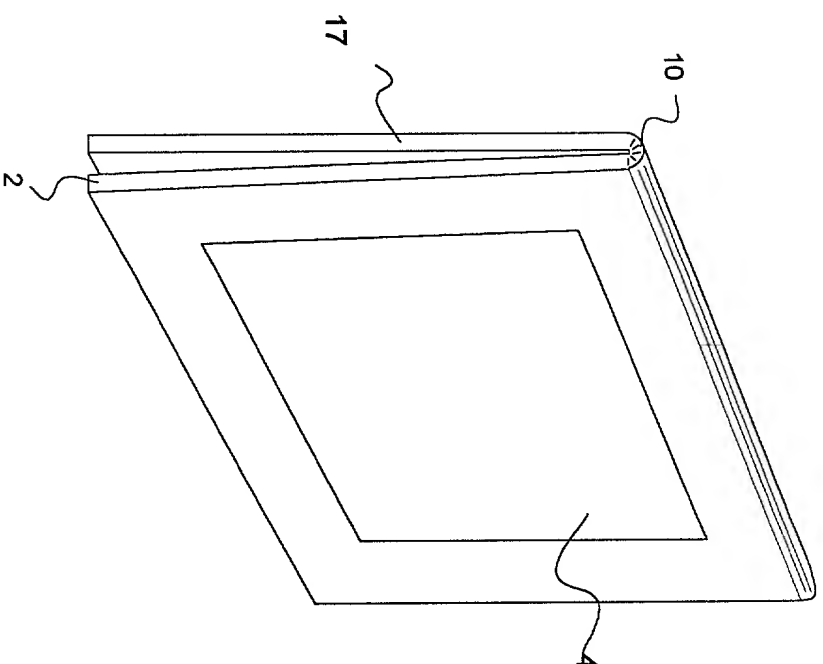
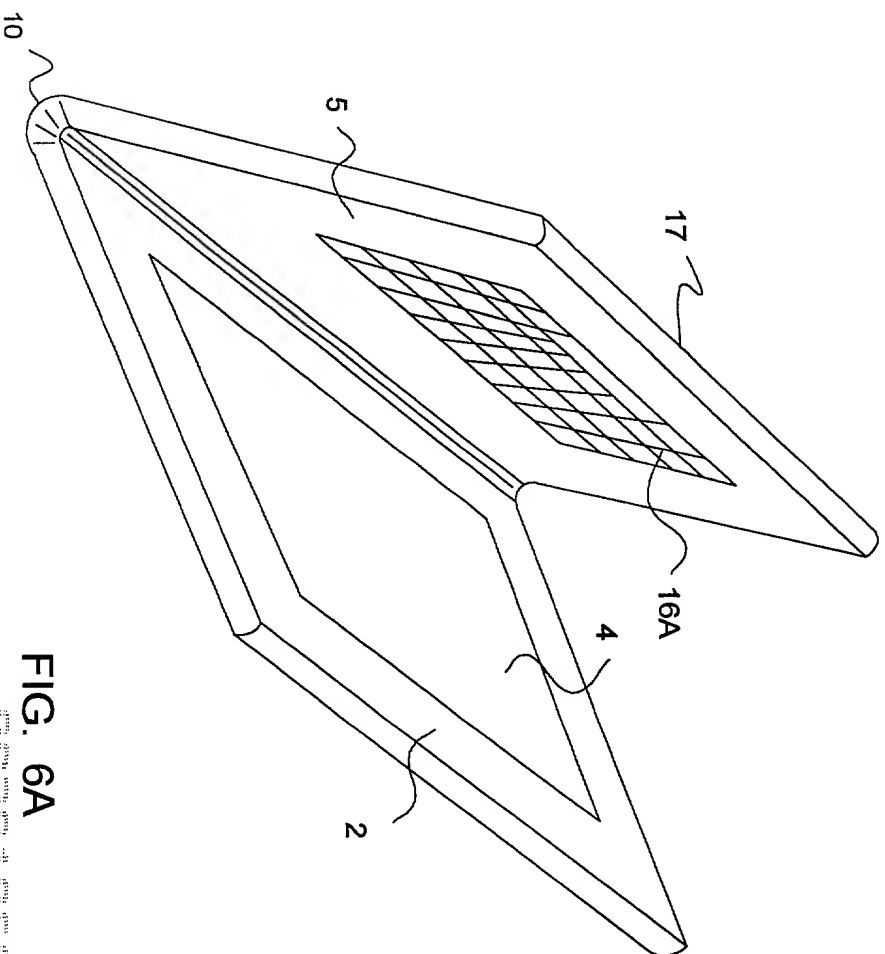


FIG. 6B

FIG. 6A

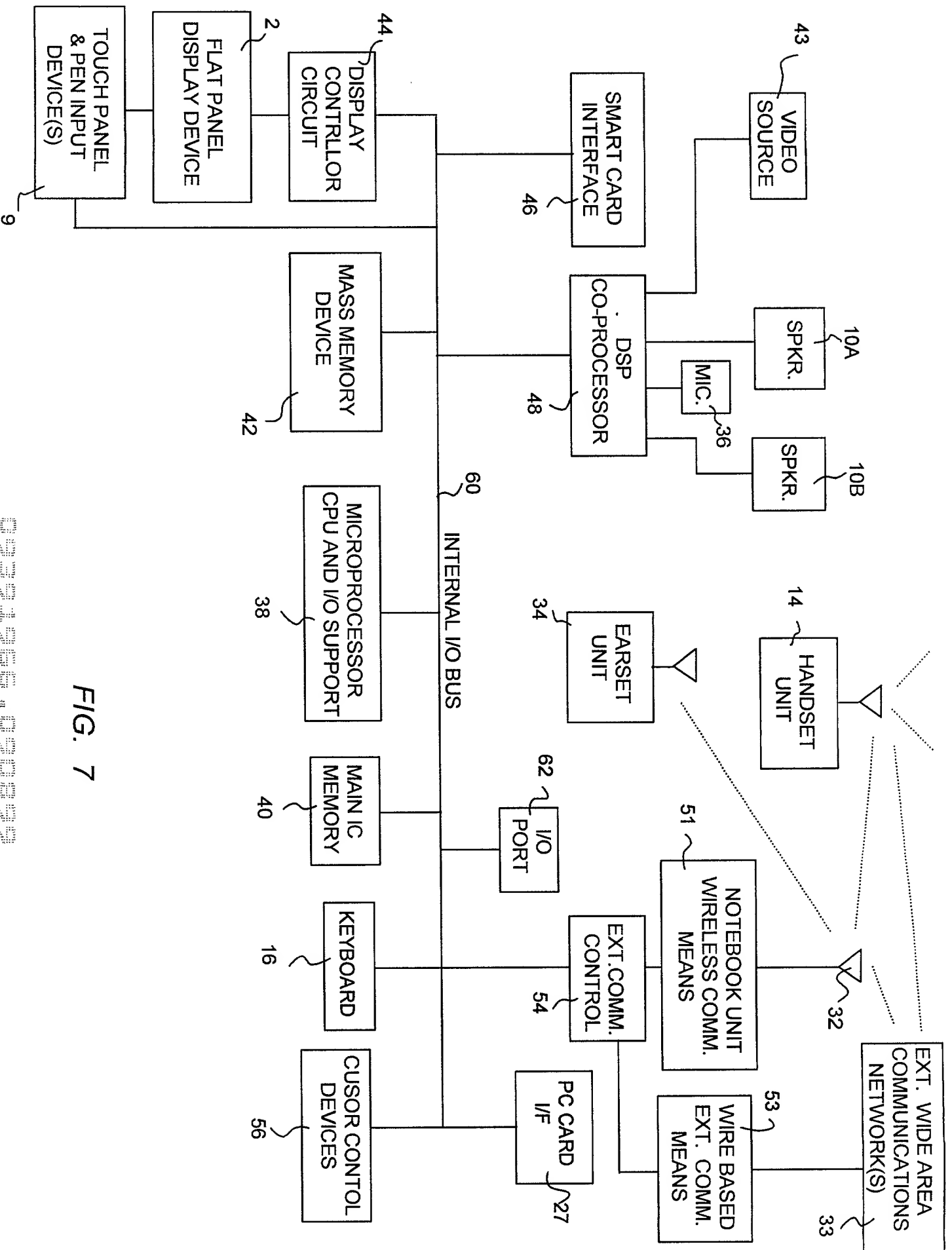
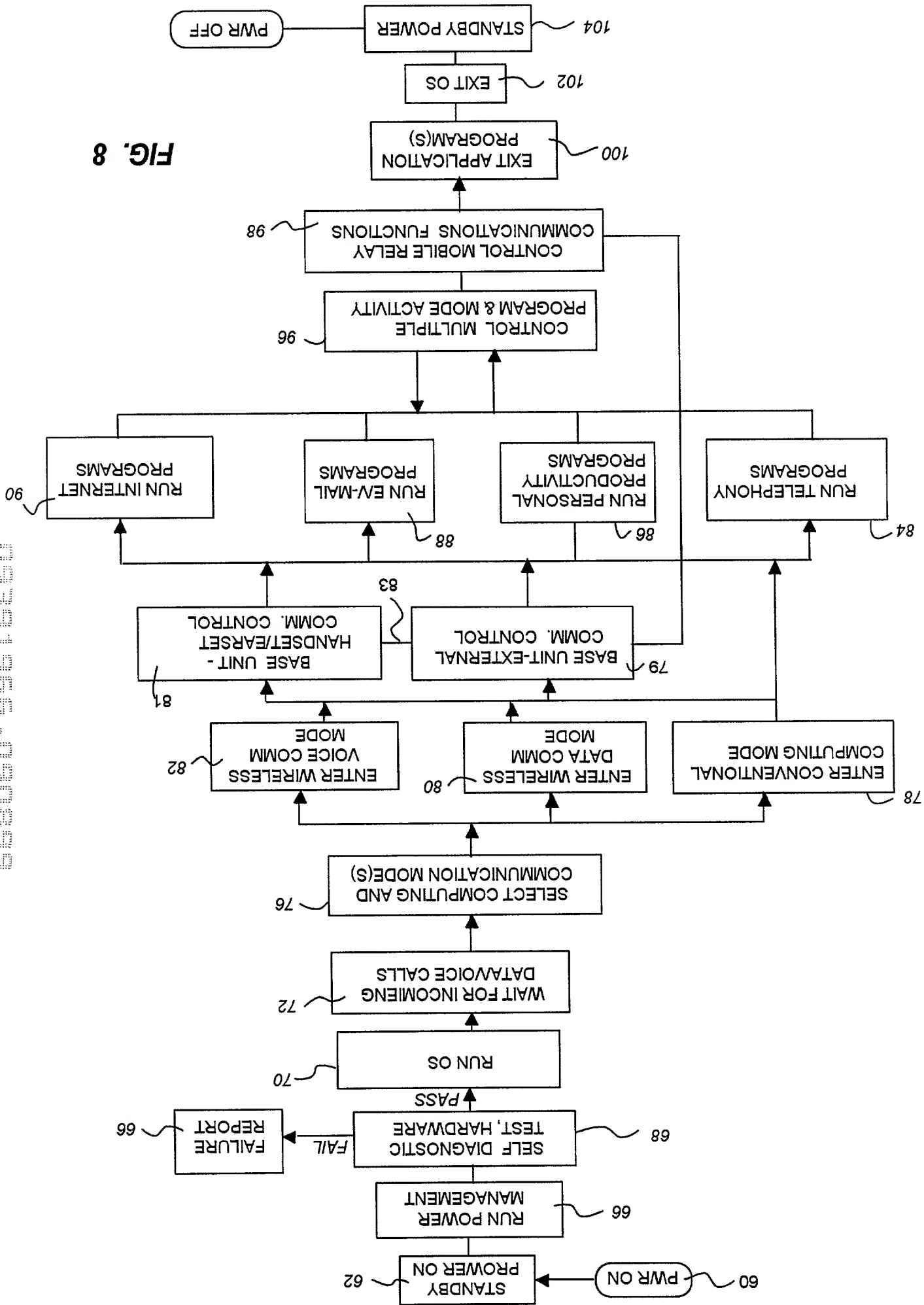


FIG. 7

FIG. 8



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<b>DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)</b>  <input checked="" type="checkbox"/> Declaration Submitted with Initial Filing OR <input type="checkbox"/> Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)	<b>Attorney Docket Number</b>	
	<b>First Named Inventor</b>	Richard J. Ditzik
	<b>COMPLETE IF KNOWN</b>	
	<b>Application Number</b>	/
	<b>Filing Date</b>	09/08/99
	<b>Group Art Unit</b>	2746
	<b>Examiner Name</b>	Urban, E.

**As a below named inventor, I hereby declare that:**

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

**Modular Notebook and PDA Computer Systems for Personal Computing and Wireless Communications.**

the specification of which (Title of the Invention)

☒ is attached hereto OR ☐ was filed on (MM/DD/YYYY) [ ] as United States Application Number or PCT International Application Number [ ] and was amended on (MM/DD/YYYY) [ ] (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?	
				YES	NO
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)

☐ Additional provisional application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

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Burden Hour Statement: This form is estimated to take 0.4 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

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## DECLARATION — Utility or Design Patent Application

I hereby claim the benefit under 35 U.S.C. 120 of any United States application(s), or 365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT international application in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

U.S. Parent Application or PCT Parent Number	Parent Filing Date (MM/DD/YYYY)	Parent Patent Number (if applicable)
08/832,923	04/04/97	

☐ Additional U.S. or PCT international application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

As a named inventor, I hereby appoint the following registered practitioner(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

☐ Customer Number

OR

☐ Registered practitioner(s) name/registration number listed below

Place Customer Number Bar Code Label here

Name	Registration Number	Name	Registration Number

☐ Additional registered practitioner(s) named on supplemental Registered Practitioner Information sheet PTO/SB/02C attached hereto.

Direct all correspondence to: ☐ Customer Number ☐ Correspondence address below

Name					
Address					
Address					
City		State		ZIP	
Country		Telephone		Fax	

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Name of Sole or First Inventor: ☐ A petition has been filed for this unsigned inventor

Given Name (first and middle (if any))	Family Name or Surname
	Ditzik

Inventor's Signature	<i>Richard J Ditzik</i>			Date	09/08/99
Residence: City	Bonita	State	CA	Country	USA
Post Office Address	307 Surrey Drive				
Post Office Address					
City	Bonita	State	CA	ZIP	91902
				Country	USA

☐ Additional inventors are being named on the supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto

## Declaration For Utility or Design Patent Application

As a below-named inventor, I hereby declare that my residence, post office address, and citizenship are as stated below next to my name and that I believe that I am the original, first, and sole inventor [if only one name is listed below] or an original, first, and joint inventor [if plural names are listed below] of the subject matter which is claimed and for which a patent is sought on the invention, the specification of which is attached hereto and which has the following title: MODULAR NOTEBOOK AND PDA

" COMPUTER SYSTEMS FOR PERSONAL COMPUTING AND WIRELESS COMMUNICATIONS "

I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment specifically referred to in the oath or declaration. I acknowledge a duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, Section 1.56(a).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Title 18, United States Code, Section 1001, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Please send correspondence and make telephone calls to the First Inventor below.

Signature: Sole/First Inventor: Richard J. Ditzik

Print Name: RICHARD J. DITZIK Date: 4 April 1997

Residence: 3143 CARNEGIE COURT Citizen Of: USA

Post Office Address: SAN DIEGO, CA 92122

Telephone: (619) 661-2252

Signature: Joint/Second Inventor: \_\_\_\_\_

Print Name: \_\_\_\_\_ Date: \_\_\_\_\_

Residence: \_\_\_\_\_ Citizen Of: \_\_\_\_\_

Post Office Address: \_\_\_\_\_

Telephone: \_\_\_\_\_

Original Declaration of  
Parent Application 08/832,923  
as filed 04/04/97.